

Adsorption of squalene and oleic acid on Latvian clays before and after dissolution of carbonates

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INTRODUCTION

Due to the sorption properties of clay minerals clays are widely used in health care as facial masks for treatment of skin inflammations, such as acne, boils and ulcers [1]. Acne is a skin disease, which is thought to be developed by increased production of sebum. Sebum is an oily substance produced by the sebaceous glands located in the skin and it is composed mainly of triglycerides, wax esters, squalene, fatty acids, cholesterol and cholesterol esters. Based on recent research, the skin of acne patients contain 59% more sebum with 2.2 times higher level of squalene [2]. Another skin disease is seborrheic dermatitis, caused mainly by increased level of oleic acid in skin sebum [3].

Most clays used in health care are within the pH range of the skin (pH 5-5.5). Therefore the presence of carbonates causes alkaline conditions, which can be irritating to the skin [4].

Basically all commercial facial clay masks available in Latvia contain illite, which is the abundant clay mineral in Latvia. Nevertheless, only 3% of these products are made in Latvia [5]. Therefore the aim of this study is to investigate the adsorption of squalene and oleic acid and to evaluate the possibility of application of Latvian clays in health care.

EXPERIMENTAL METHODS

Clay samples from Iecava, Laža and Prometejs deposits with particle fraction $< 63 \mu\text{m}$ were used. The carbonates were dissolved in citric and hydrochloric acids, where the acid was added stepwise to keep the pH above 4.5. The excess acid was removed by washing with distilled water. The sorption experiments were performed with squalene and oleic acid solutions in squalene media. Clay samples were mixed with corresponding solution and left still for 5 and 15 minutes. The residue

concentration was determined using UV spectrophotometer. To evaluate the sorption properties, the obtained results were compared with one commercial facial clay mask containing illite.

RESULTS AND DISCUSSION

All clay samples adsorb both organic compounds. The adsorption of oleic acid occurs to a greater extent than squalene and depends on the initial concentration. The best results for oleic acid showed Iecava clays treated with citric acid and the commercial clay mask, but overall the adsorption of oleic acid on all samples was very similar. Also there are small differences between the adsorption time (5 and 15 minutes).

CONCLUSION

Based on the obtained results, clays in Latvia with particle fraction $< 63 \mu\text{m}$ can be used in health care as facial masks for removal of oleic acid and squalene found in sebum.

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